

REMARKS:

Election/Restriction

Claims 1 to 13 and 18 to 22 have been cancelled.

Specification

The specification has been amended to provide section headings where appropriate and to include: a summary of the invention and brief descriptions of the figures. The specification now contains an abstract on a separate sheet. No new subject matter has been added.

Applicant notes that the Office Action Summary indicates in box 10b that the drawings are objected to. However, the Examiner did not raise any specific objections to the drawings in the Detailed Action. As such, the drawings have not been amended.

Status of Claims

Claims 1 to 13 and 18 to 22 have been cancelled. New claims 24 to 27 have been added.

Claims 14 to 17 and 23 to 27 are pending.

Claims 14 and 17 have been amended for clarity. Claim 23 has been amended to more clearly convey that the photocatalysts and microradiators are separate particles and that the microradiators are charged up at an electromagnetic radiation source and transported to the photocatalysts. Support for the amendments to claim 23 can be found throughout the description. Applicant directs the Examiner to paragraphs [0018] – [0020] of the published application (US Publication 2005-0178649 A1) where it describes transport of the microradiators to the photocatalysts; and to paragraphs [0028] – [0031] where it describes that in a particular embodiment the microradiators can be separated from the photocatalysts and/or reaction medium before being charged up. Applicant submits that these teachings would not be possible if the microradiators and photocatalysts were one particle. New claims 24 to 27 have been added, the subject matter corresponding to the subject matter found in cancelled claims 7, 8, 9 and 20.

Claim rejection under 35 USC 112

The Examiner stated that there is no antecedent basis for “the phosphorescent particles” and “the radiation source again” in claim 14. Claim 14 has been amended to clarify that the phosphorescent particles are the microradiators and that the microradiators are again conveyed past the “electromagnetic radiation source” of claim 23 (from which claim 14 depends). Claim 23 now recites that the microradiators are charged at this electromagnetic radiation source. Applicant submits that the terms of claim 14, as presently amended, have proper antecedent basis.

Claim rejection under 35 USC 103

The Examiner rejected claims 23, 14 and 16 under 35 USC 103(a) as unpatentable over Poncelet (U.S. 5,972,831) in view of Ogata (U.S. 6,107,241). The Examiner also rejected claim 15 under 35 USC 103(a) as unpatentable over Poncelet (U.S. 5,972,831) in view of Ogata (U.S. 6,107,241) and in further view of Stone (U.S. 4,210,953). The Examiner further rejected claim 17 under 35 USC 103(a) as unpatentable over Poncelet (U.S. 5,972,831) in view of Ogata (U.S. 6,107,241) and in further view of Fu (U.S. 6,287,993).

Poncelet discloses a photocatalytic composition comprising an inorganic photocatalyst particles capable of destroying organic chemical compounds by oxidation reaction under the action of solar radiation (see col. 2, lines 30-34), the particles being dispersed in a polymer binder. Poncelet teaches that the binder enables the particles to be trapped in a gel. The gel can be dried on a flat surface, used as a monolith (see col. 3, lines 55-59), or mixed directly with the solution to be treated. The photocatalytic composition disclosed by Poncelet is exposed to solar radiation to active the photocatalyst, resulting in the destruction of the organic compounds.

Ogata teaches a method for improving the binding ability of a photocatalyst (e.g. titanium oxide) to a surface. In particular, Ogata teaches the use of an amorphous titanium peroxide sol as a binder to fixedly support the photocatalyst on a substrate. In one embodiment, Ogata discloses a photocatalytic body comprising photocatalyst particles and light storage-type UV radiating material, “prior to shaping, the particles made of a spontaneous UV radiating material or a light storage-type UV radiating material, or particles containing such radiating materials

may be mixed with a photocatalyst" (column 5, lines 17-20). The sol is then coated onto a substrate, and dried to form a film (see col. 4, lines 26, 41 and 52).

The Examiner stated that the process defined by claim 23 is obvious since Poncelet discloses a method for photocatalytic treatment of effluents using solid photocatalysts suspended in a liquid medium, and that Ogata discloses a photocatalytic body made up of a mixture of light-storing ceramic particles and photocatalytic semiconductor. The Examiner noted that in col. 5 lines 49-58, Ogata teaches that the photocatalytic semiconductor is excited by the UV light generated by the light-storing ceramic particles. The Examiner stated that it would be obvious to combine the light-storing photocatalytic bodies of Ogata with the process of Poncelet to obtain the claimed process.

Applicant respectfully disagrees. The present invention is directed to a process for carrying out a photocatalytic process, wherein the photocatalytic particles and the light emitting particles (microradiators) are separate particles. Energy is *actively transported* by the light emitting particles (microradiators) to the photocatalytic particles. Finally, in the present case, the microradiators are *not fixed* to a surface.

Claim 23 as amended clarifies that the microradiators are charged at an electromagnetic radiation source, and are then transported to the photocatalysts and used to excite said photocatalysts. Neither Poncelet nor Ogata discloses or suggests these features.

The photocatalytic body disclosed by Ogata is a single solid (film) body having both light-storing and photocatalytic elements. These elements are fixed within the solid body and are not free to move around. In particular, the light-storing particles disclosed by Ogata cannot transport energy to the photocatalytic particles. Therefore, even if a person of skill in the art used the photocatalytic body of Ogata in the process disclosed by Poncelet, there would be no active transport of energy by light emitting particles to photocatalytic particles.

With regard to claims 14 - 17, Applicant respectfully submits that the claim depends from claim 23 and includes all the limitations thereof. In view of this and the above arguments, Applicant submits that claims 14 - 17 are also non-obvious. Specifically, Applicant reiterates that neither the photocatalytic body of Poncelet nor Ogata disclose *active transportation* of energy by the

light-storing particles to the photocatalytic particles since both components are fixed in a single photocatalytic body. Since all the limitations of the claimed invention are not disclosed by Poncelet and Ogata, Applicant submits that claims 14 - 17 are non-obvious in view of these references, even when combined with Stone and/or Fu, as discussed below.

Applicant submits that Stone describes a flashlight with a bulb, the phosphorescent material in Stone being affixed to the wall of the flashlight and used to indicate the location of the flashlight. Applicant respectfully submits that this phosphorescent material has nothing to do with photocatalytic reactions or the transportation of energy. The phosphorescent material is affixed to the wall of the flashlight and serves merely to receive energy and later emit it. Not only does the combination of references in no way disclose or suggest the present invention, the Applicant further submits that the combination with Stone is inappropriate. Stone relates to a very different field of endeavour; there is no suggestion in any of the references to combine them, and the person of skill in the art would not be motivated to do so.

Fu teaches materials for a yellow-to-red-emitting phosphor. Applicant agrees that materials having phosphorescence were known. However, Fu does not disclose the use of phosphorescent particles for activating photocatalysts by active transport of such particles to the photocatalysts.

In view of the arguments presented above, it is respectfully submitted that the invention as defined by the amended claims complies with 35 USC 103(a) and withdrawal of the objections on that basis is respectfully requested.

In addition, it is submitted that the Examiner has not articulated the following: (1) a finding that there was some teaching, suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings; (2) a finding that there was reasonable expectation of success; and (3) whatever additional findings based on the Graham factual inquiries may be necessary, in view of the fact that the case under consideration, to explain the conclusion of obviousness. Since the Examiner has not made all of these findings, this rationale cannot be used to support a conclusion that the claims would have been obvious to one of ordinary skill in the art. For example, the first finding has not been made since the references do not contemplate the

problem being solved by the present invention (in particular the *active transport* of energy to the photocatalytic particles). Therefore, the references cannot be modified or combined to come up with a solution to a problem they do not even contemplate, as discussed in detail above. It is respectfully submitted that neither of the other two findings has been articulated, most notably the factual inquiries set forth in Graham summarized by the Examiner as: "Resolving the level of ordinary skill in the pertinent art" and "Considering objective evidence present in the application indicating obviousness or non-obviousness". All of the necessary findings must be articulated for the rejection to be proper. This burden has not been met.

Reconsideration and allowance of this application is respectfully requested.

Respectfully submitted,

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